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(71) Applicant and

(72) Inventor: POLLACK, Steven, Bradley [US/US]; 2859
Summit Avenue, Highland Park, IL 60035 (US).

(74) Agent: EDELSON, Leon, I.; Law Office of Leon I. Edelson,
P.O. Box 2465, Chicago, IL 60690-2465 (US).

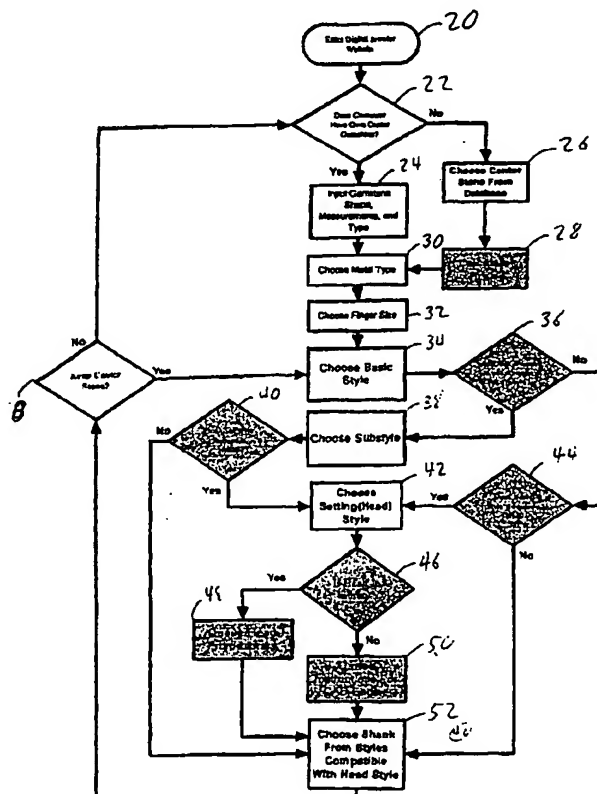
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(54) Title: SYSTEM AND METHOD FOR DESIGNING CUSTOM JEWELRY



(57) Abstract: System and method to provide electronic custom jewelry design services for users comprising the steps of requesting the user's desired gemstone characteristics (24), requesting the user's gemstone jewelry setting characteristics (42), and generating a three dimensional image of the gemstone and jewelry setting characteristics.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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SYSTEM AND METHOD FOR DESIGNING CUSTOM JEWELRY**DESCRIPTION****Technical Field**

The present invention relates to a system for the custom design of jewelry by non-jewelers. The present application is directed to one of ordinary skill in the art of jewelry design and computer programming.

Background of the Invention

Goldsmiths have made jewelry using time-honored techniques for thousands of years. The two main methods are direct metal fabrication and lost wax casting. Lost wax casting became a favorite during the industrial revolution due to its inherent repeatability. In lost wax casting, wax models of jewelry are carved out of a larger block of hard wax using hand and machining methods. These waxes are then invested in a flask whereby liquid ceramic-like material is poured around the wax.

After the investment has hardened, the wax is then burned out in a kiln, and the temperature is raised to the point where the investment fuses in a similar way to pottery. Molten metal is then poured into the negative space that was once the wax.

Developments in computers have brought Computer Aided Drafting (CAD) and Computer Aided Manufacturing (CAM) into the mainstream. CAD/CAM has allowed the original wax jewelry model to be designed and machined using precision techniques originally developed for other larger industries, such as automotive and aerospace.

With this jump in precision came the need to find competent CAD designers versed in both the difficult to learn CAD software and also the jeweler's art. There are few such people to bridge the gap between goldsmith, artist, and engineer.

5 The present invention overcomes this problem by keeping most of the CAD functionality hidden from the consumer. Instead of the consumer learning the steps necessary to achieve each modeling step, the consumer can choose a particular jewelry feature that they wish to incorporate into the model from a library of features which have the instruction sets pre-programmed for both creating the feature and interacting with other features. The present invention allows a consumer to create unique jewelry items
10 with no prior experience or skill in an age old craft, of a quality achievable by only the top few percent of craftsmen in that field with the help of CAM.

Consumers want the computer to give them what they want without the fuss of learning how to make it happen. The present invention is a consumer-oriented interface for complex and powerful CAD capabilities that are now common, albeit difficult to use.

15 The present invention also provides proper technical goldsmithing parameters so that a consumer can produce a quality result without specialized knowledge of goldsmithing. Lay people can choose features they want or don't want instead of envisioning the entire jewelry project. The present invention gives them this feature based decision making that best matches their natural decision making process.

Finally, by being a server side application instead of distributed software, change can be effected immediately for the entire consumer base. The server side configuration also has the benefit of the manufacturer controlling the finished CAD model, thus the customer's options for purchase of that design stay with that seller

5 In conclusion, the present invention is at the same time a unique software, business method, and manufacturing method. Instead of just incrementally adding upon the foundation of previous technology advances, it adds a fundamentally new layer to the designing, manufacturing, and selling of fine jewelry by allowing the consumer to become the digital goldsmith.

10 Summary of the Invention

The present invention discloses a method of providing electronic custom jewelry design services for consumers and jewelers comprising the steps of requesting the consumer's desired gemstone characteristics, requesting the consumer's jewelry setting characteristics and generating a three dimensional image and solid model of the gemstone and gemstone setting. Also disclosed is a system for performing the method.

15 Brief Description of the Drawings

Figure 1 is a diagram of the system according to a preferred embodiment of the present invention; and

Figure 2 is a flow chart of the system according to a preferred embodiment of the present invention.

Detailed Description

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated. For example, the operation of the present system will be described with reference to the custom design of a ladies ring. However, it will be apparent to one of ordinary skill in the art that the present invention can be implemented with respect to many different types of jewelry, for example bracelets, necklaces, earrings, and the claims of the present application should not be limited to rings. It is also contemplated that the present invention can be used to design other items which contain precious metals or gemstones, such as custom silverware.

Referring to Figure 1, a preferred embodiment of the invention comprises a client computer 2 and a custom jewelry design server 4. Each computer 2, 4 is attached to a computer network 8. The computer network 8 is preferable a wide area network, such as the Internet, so that the computers 2, 4 can be remotely located with respect to each other. The client computer 2 executes a client software program 10 which allows the consumer to communicate with the custom jewelry design server 4. Preferably the client software program 10 comprises a standard web browser, such as Microsoft Internet Explorer or Netscape Navigator. The client computer can be any computer which has the capability

to receive input, display results and communicate via the Internet, such as a personal computer or a portable digital assistant. Optionally, the present system can further include a jeweler's computer 6. The jeweler's computer 6 is attached to the computer network 8 and can communicate with the custom jewelry design server 4 to receive
5 electronic parametric information about the custom jewelry, as explained below. The computer network of the present invention includes a "direct-dial" network facilitating standard telephone lines.

The custom jewelry design server 4 executes custom jewelry design software 12. The custom jewelry design software 12 is responsive to requests by a user using the client
10 computer 2, as explained below. The custom jewelry design server 4 also contains information about various gemstones, jewelry styles, jewelry substyles, jewelry head styles, jewelry shank styles and other jewelry attribute information. The custom jewelry design software 12 also employs a Computer Aided Design (CAD) Engine 9 for rendering three dimensional images.

15 Referring to Figure 2, to use the system of the present invention, in step 20 the user enters the Internet web address of the custom jewelry design server 4, such as *www.digitaljeweler.net*, into the web browser software on the client computer 2. In step 22, next the custom jewelry design server 4 inquires if the user has his own center gemstone. If the user responds that he does have his own gemstone, the user is asked in
20 step 24 to enter the gemstone shape, measurements and type. If the user does not have

his own gemstone, the user is asked to choose a center gemstone from a database of available center gemstones having different shapes, sizes and type in step 26. In step 28, the custom jewelry design server 4 calculates the price of the gemstone selected and displays the price to the user.

5 Next, the user is asked to choose a type of metal in step 30 for the ring and a finger size in step 32. In step 34, the user is asked to choose a basic style for the ring. Next, in step 36 the custom jewelry design server 4 determines if the selected basic style requires the choice of a substyle. If the basic style requires the choice of a substyle, the custom jewelry design server 4 advances to step 38 where the user is requested to choose
10 a substyle from a list of substyles which are compatible with the style chosen. Next, in step 40 the custom jewelry design server 4 determines if a head setting is required for the substyle chosen. If a head is required, the custom jewelry design server 4 determines which heads are compatible with the basic style and substyle chosen, and the user is asked to select a compatible head from a list of compatible heads in step 42. After a head
15 is chosen, the custom jewelry design server 4 determines if the head chosen is in a head library on the custom jewelry design server 4 in step 46. If the head is in the head library, the custom jewelry design server 4 queues the rendered head from the head library in step 48 for later display. If the head is not in the head library the custom jewelry design server
20 4 queues parametric information about the head from the CAD engine in step 50. The custom jewelry design server 4 then advances to step 52.

If in step 36, the custom jewelry design server 4 determines that the basic style chosen does not require the selection of a substyle, the custom jewelry design server 4 advances to step 44. In step 44, the custom jewelry design server 4 next determines whether the basic style chosen requires a head. If the basic style requires a head, the
5 custom jewelry design server 4 advances to step 42, described above.

If the basic style chosen does not require a head in step 44, the custom jewelry design server 4 advances to step 52. Similarly, if the custom jewelry design server 4 at step 40 determines the substyle chosen does not require a head, the custom jewelry design server 4 advances to step 52. At step 52, the custom jewelry design server 4 determines
10 which shank styles are compatible with the gemstone, basic style, substyle, and/or head previously chosen and requests the user to select a shank style from the compatible shank styles and advances to step 54.

At step 54, the custom jewelry design server 4 determines shank thicknesses which are compatible with the shank selected and requests the user to select a shank
15 thickness from a list of compatible shank thicknesses and advances to step 56. At step 58, the custom jewelry design server 4 determines whether the shank is available from the shank library. If the shank is available from a shank library, the custom jewelry design server 4 queues the rendered shank from the shank library in step 60 for later display. If the shank is not available from the shank library, the custom jewelry design server 4
20 queues parametric information about the shank for the CAD engine in step 62.

At step 64, the custom jewelry design server 4 requests the user to determine whether side gemstones will be on the ring. If the ring will include side gemstones, the custom jewelry design server 4 advances to step 66 where the user can select the shape, size, setting and type of gemstone to be used as side gemstones. Next, the custom jewelry design server 4 advances to step 68.

If, at step 64, the user chooses to not include side gemstones, the custom jewelry design server 4 advances to step 68. At step 68, the price of the ring as configured is calculated and displayed to the user. The custom jewelry design server 4 then advances to step 70 where the system asks the user if the price is acceptable. If the price is not acceptable, the custom jewelry design server 4 returns to step 54. If the price is acceptable, the system advances to step 72 where the user is requested to select whether the ring will include other modifying attributes including, but not limited to, a taper. If the ring does not include a taper, the custom jewelry design server 4 advances to step 76. If the ring is to include a taper, the custom jewelry design server 4 queues parametric information about the taper for the CAD engine at step 74 and advances to step 76.

At step 76, the user is requested to choose whether the ring will have other accents. If the user chooses not to include other accents, the custom jewelry design server 4 advances to step 80. If the user chooses to include other accents, the custom jewelry design server 4 advances to step 78 where it recalculates the price of the ring and advances to step 80. At step 80, the custom jewelry design server 4 submits the queued

parametric information to the CAD engine where it waits to be processed inline with other simultaneous users at step 82. The CAD engine then renders and animates the ring as the user has previously chosen at step 84. The rendering can be either be a still image or, optionally, a rotatable image, such as an Adobe QuickTime VR image.

5 At step 86, the custom jewelry design server 4 asks the user if he is satisfied with the final appearance of the ring. If the user is not satisfied with the final appearance of the ring, the custom jewelry design server advances to step 88. At step 88, the user determines whether he would like to restart the design process with the same gemstone or with a new gemstone. If the user chooses to restart the process with a new gemstone, the
10 custom jewelry design server 4 returns to step 22. If the user chooses to restart the design process with the same gemstone, the system returns to step 34. It is also contemplated that the present system will allow a user to back up any specified number of steps in order to change a choice previously made.

 If the user is satisfied with the final appearance of the ring, the custom jewelry
15 design server 4 advances to step 90. At step 90, the custom jewelry design server 4 saves a file containing the parametric information queued for the CAD engine in an electronic format appropriate for the CAM engine used and, optionally, textual information describing the choices made in the design process. Next, at step 92, the user is asked to pay for the ring. The parametric information file is then processed in step 94 into layers

or slices for use by a Computer Aided Manufacturing (CAM) machine to create either a wax model or a direct metal fabrication technique in step 96.

Next, in step 98 the custom jewelry design server 4 determines if a jeweler who will make the ring requires a wax model. If the jeweler does require a wax model, the wax model is shipped in step 100 and the jeweler is invoiced in step 102. If the jeweler does not require a wax model, the ring is cast in step 104. Next, in step 106 the custom jewelry design server 4 determines whether jeweler wishes to finish the ring and set the mounting. If the jeweler does wish to finish the ring and set the mounting, the casting is shipped to the jeweler in step 108 and the jeweler is invoiced in step 102. If the jeweler does not wish to finish the ring and set the mounting, the manufacturer finishes the ring and sets the mounting in step 110 and invoices the jeweler in step 102. It is also contemplated that rather than sending the jeweler a wax model, unfinished ring or finished ring, the electronic file containing parametric information regarding the ring can be electronically transferred to the jeweler's computer 6 to allow the jeweler to manufacture the ring from a wax model or directly fabricate it from a CAD parametric information.

It is also contemplated that at each step the user is asked to make a choice, informative information about each choice is provided in order to help the user arrive at a decision. Informative information can include, but is not limited to, information

regarding the price of the various options, the relative strength and durability of various options, and an opinion about the popularity or aesthetic appeal of each option.

Further, it is contemplated that rather showing the price at two points in the design process, that the price be recalculated after each choice is made by the user.

5 Finally, it is also contemplated that the present system can be implemented by providing all of the design choices on a single display screen of the client computer 2. Each time a design choice is changed the ring is redisplayed to the user and the price updated to reflect the design change.

10 While the specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention and the scope of protection is only limited by the scope of the accompanying claims.

CLAIMS

I claim:

1. A method of providing electronic custom jewelry design services for users over a wide area network comprising the steps of:

5 requesting the user's desired gemstone characteristics via the wide area network;
 requesting the user's jewelry setting characteristics via the wide area network; and
 generating parametric information describing the desired gemstone settings and
the user's jewelry settings from which the jewelry can be manufactured.

2. The method of claim 1 further comprising the steps of:

generating a three dimensional image of the gemstone and gemstone setting; and
transmitting the three dimension image to the user over the wide area network.

3. The method of claim 1 wherein the step of requesting the user's desired gemstone characteristics comprises the step of:

requesting the user to provide gemstone shape data, measurement data, and type data.

4. The method of claim 1 wherein the step of requesting the user's desired gemstone characteristics comprises the steps of:

displaying a plurality of gemstones;

requesting the user to choose a gemstone from the plurality of gemstones;

5 displaying the chosen gemstone in a plurality of shapes;

requesting the user to choose a shape of the gemstone; and

displaying the chosen gemstone with the chosen shape.

5. The method of claim 3 further comprising the step of displaying current jewelry cost information after each displaying step.

6. The method of claim 1 where the step of requesting the user's gemstone setting characteristics comprises the steps of:

displaying a plurality of gemstone setting styles;

requesting the user to choose a gemstone setting style;

5 displaying the chosen gemstone setting style in a plurality of setting shank styles;

and

requesting the user to choose a setting shank style.

7. The method of claim 6 further comprising the step of displaying current jewelry cost information after each displaying step.

8. The method of claim 6 wherein a gemstone is shown in the gemstone setting for the recited steps of:

displaying a plurality of gemstone setting styles; and

displaying the chosen gemstone setting style in a plurality of setting shank styles.

9. The method of claim 6 wherein the step of displaying a plurality of gemstone setting styles further comprises indicating whether a particular gemstone setting will not work with a chosen gemstone shape, measurement or type.

10. A system for providing electronic custom jewelry design services for users over a wide area network comprising:

means for requesting the user's desired gemstone and for requesting the user's jewelry setting via the area network; and

5 means for generating parametric information describing the desired gemstone settings and the user's jewelry settings from which the jewelry can be manufactured.

11. The system of claim 10 further comprising:

means for generating a three dimensional image of the gemstone and jewelry setting; and

means for transmitting the three dimensional image of the gemstone and jewelry setting over the wide area network.

12. The system of claim 10 wherein the means for requesting the user's desired gemstone comprises:

means for requesting the user to provide gemstone shape data, measurement data, and type data.

13. The system of claim 10 wherein the means for requesting the user's desired gemstone comprises:

means for displaying a plurality of gemstones, for displaying a chosen gemstone in a plurality of shapes, and for displaying the chosen gemstone with the chosen shape; and

means for requesting the user to choose a gemstone from the plurality of gemstones and for requesting the user to choose a shape of the gemstone.

14. The system of claim 13 further comprising means for displaying current jewelry cost information.

15. The system of claim 10 wherein the means for requesting the user's gemstone setting comprises:

means for displaying a plurality of gemstone setting and displaying the chosen gemstone setting in a plurality of setting shank styles; and

5 means for requesting the user to choose a gemstone setting and requesting the user to choose a setting shank style.

16. The system of claim 15 further comprising means for displaying current jewelry cost information.

17. The method of claim 15 wherein the means for displaying further comprises means for showing the gemstone in the gemstone setting.

18. The system of claim 15 wherein the means for displaying a plurality of gemstone setting styles further comprises means for indicating whether a particular gemstone setting is not compatible with the chosen gemstone.

19. A method of offering custom jewelry to a user comprising:
- providing a custom jewelry design server implementing a CAD software package
and being connected to a wide area network;
- requesting the user to choose preferred attributes of the custom jewelry via the
5 wide area network; and
- providing the custom jewelry to the user.

20. The method of claim 19 wherein the wide area network is a direct dial
network.

21. The method of claim 19 wherein the custom jewelry is silverware.

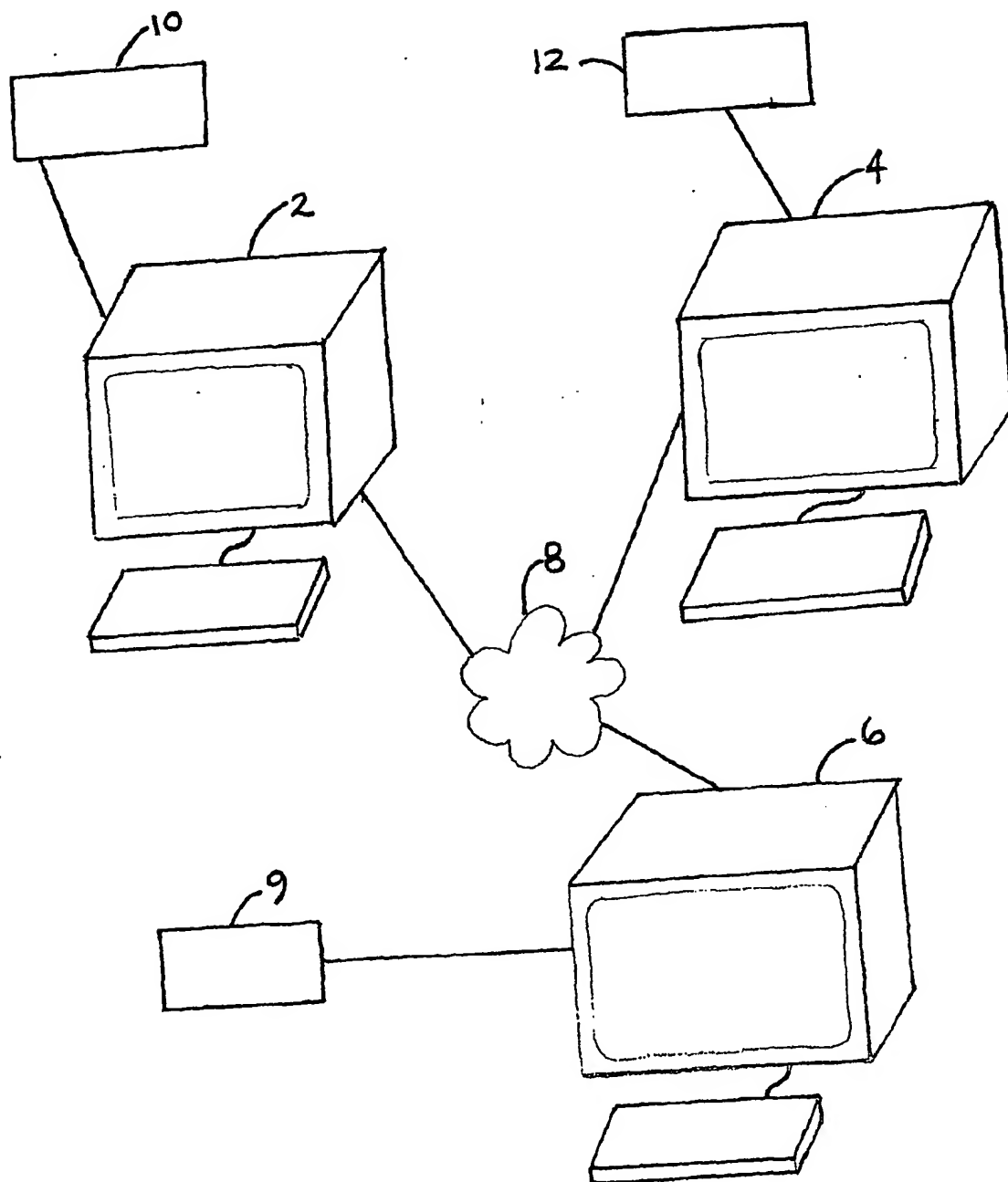
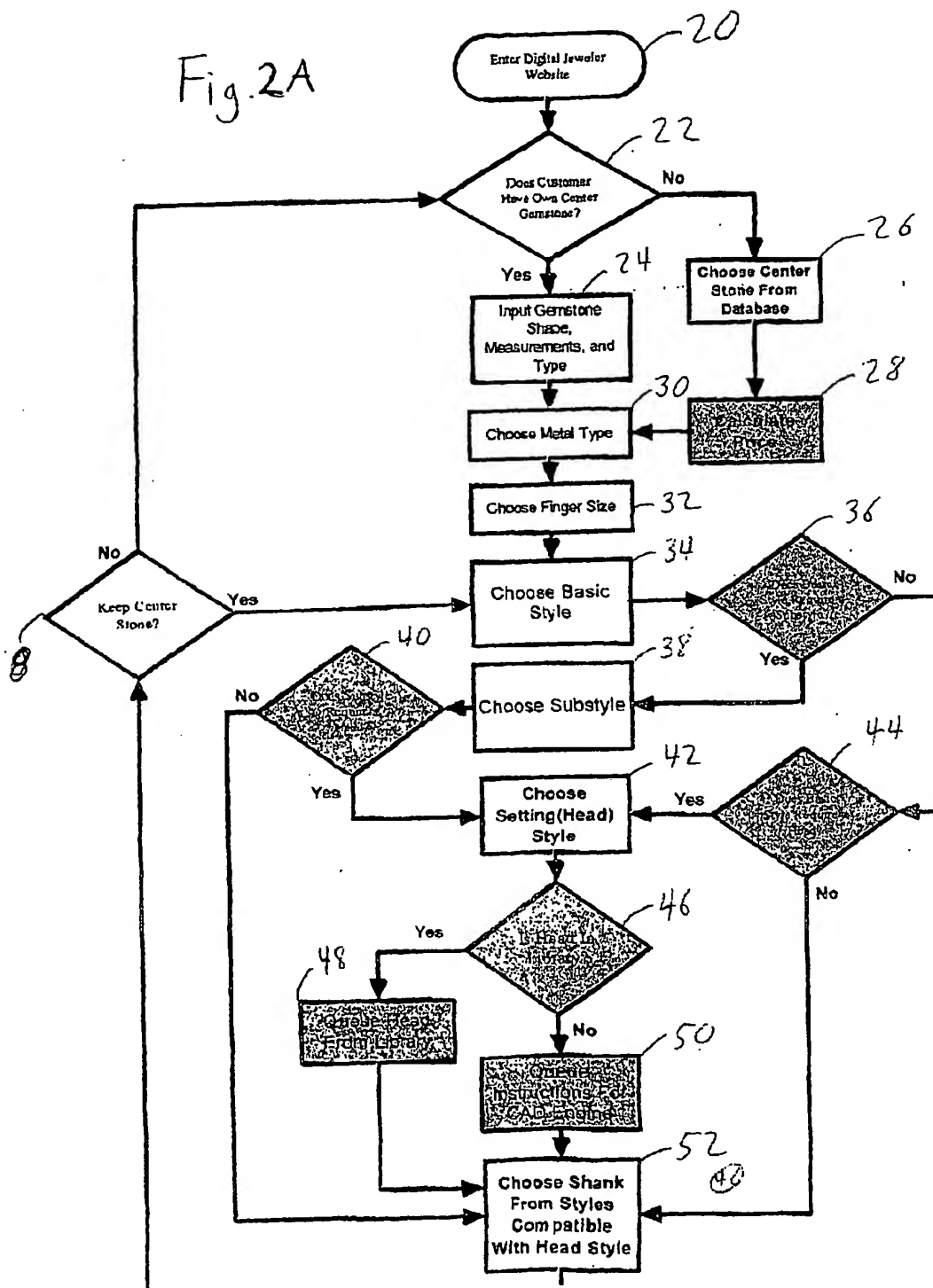


Fig. 1

Fig. 2A



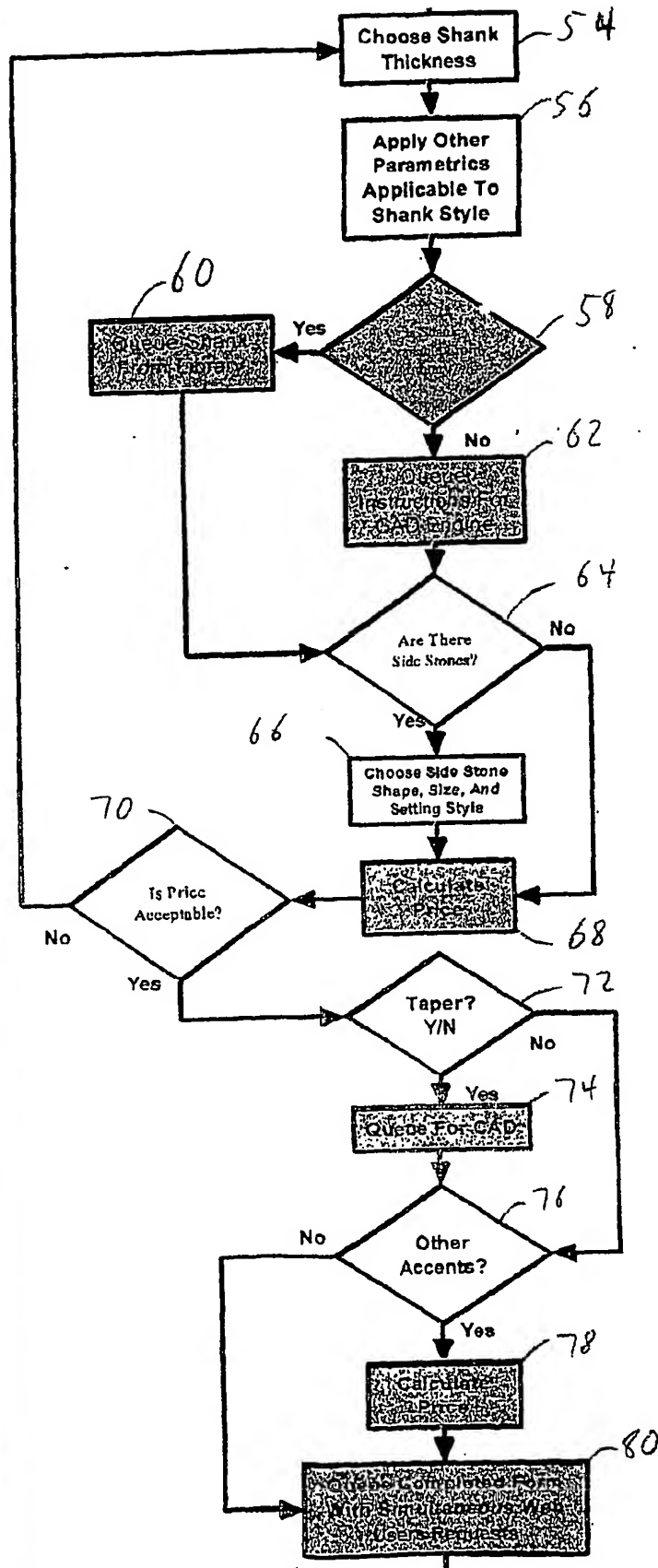
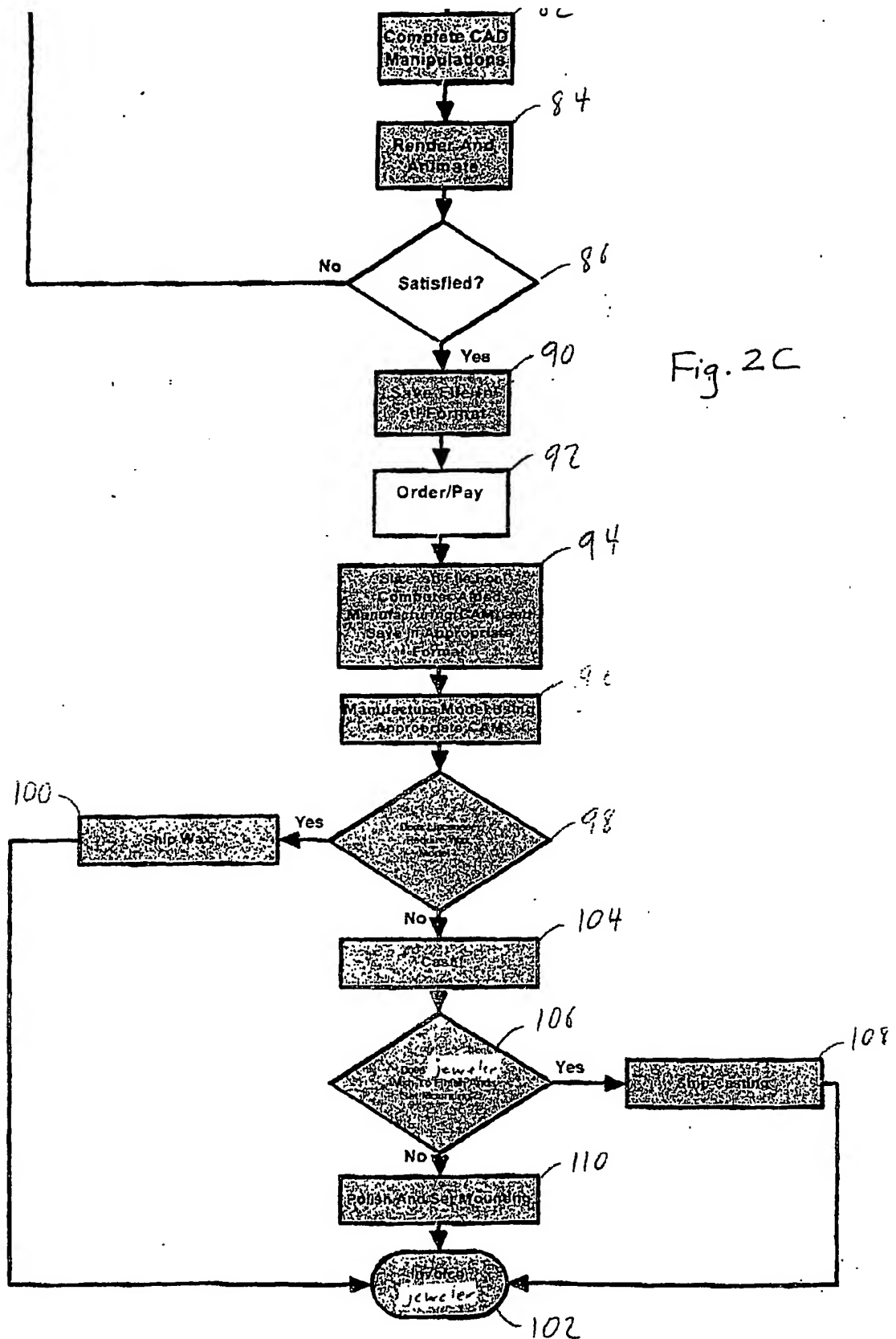


Fig. 2B



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60

US CL : 705/26, 27

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/26, 27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DIALOG**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 00/57254 A1 (LASER OPTRONIC TECHNOLOGIES) 28 September 2000 (28.09.00), Abstract and Summary.	1-3, 6, 8-12, 15, 17, 19-21
X	No Author "Diamond Information Center Launches Innovative New Design your Own Diamond Engagement Ring Feature on Website" (PR Newswire) 17 June 1999 (1999-06-17)	1, 10
Y	US 5, 796, 986 A (FULLER) 22 August 1996 (22.08.1996), Figure 1.	1, 10, 19
Y	US 4, 725,511 A (REBER) 05 May 1986 (05.05.1986), column 3, lines 67-68; column 4, lines 1-20.	19
Y	US 6, 003,228 A (RIGGIO) 14 May 1998 (14.05.1998), column 2, lines 3-33; column 4, lines 10-67; column 5, lines 1-67.	1, 2, 10, 11, 19
Y	US 4 2,106, 221 A (SELON) 02 February 1977 (02.02.1977), column 1, lines 6-64; column 2, lines 54-68; column 3, lines 29-38; column 5, lines 38-39.	1, 3, 4, 10, 12, 13, 17
Y	US 5, 970,471 A (HILL) 22 March 1996 (22.03.1996), column 1, lines 6-13; column 2, lines 7-35; column 3, lines 11-22; column 4, lines 6-18; column 5, lines 20-26.	1, 3, 4, 6, 8, 10, 12, 13, 15, 17, 19, 20
Y	WO 93 20522 A1 (AB AUTOENGRAVING) 14 October 1993 (14.10.93), Abstract and Summary.	1, 10
Y	No Author "Industry Takes Hi-Tech Hike to Future" (Israel Business Today) 31 March 1997 (1997-03-31), The whole article.	1, 19

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Washington, D.C. 20231

Facsimile No.

Authorized officer

Naeem Haq

James R. Matthews

Telephone No. 703-305-8052